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## UNUSUAL FACTORS CONTRIBUTING TO THE DESTRUCTION OF YOUNG GIANT SEQUOIAS

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During the summer of 1966, a stand of dead and dying 10- and 11-year-old giant sequoias, *Sequoiadendron giganteum*, was discovered in the Abbot Creek drainage of the Cherry Gap Grove of Sequoias in Sequoia National Forest. This grove is located immediately south of Converse Basin at 36°46'5" N lat., and 118°56'49" W long.

This area was originally logged along with Converse Basin during the latter part of the last century. Although evidence is lacking, it is felt that the parent trees of the young sequoias in question were seeded at the time of logging. In 1955, this entire area was consumed by an intensely hot fire known locally as the "McGee Burn." The parent trees were killed by the fire, but disseminated the seeds which had apparently remained viable in the green cones after the fire.



FIG. 1. Stump of a 10 year old giant sequoia showing the base girdled by rodents and the fruiting bodies of *Hyphloma* sp.

Approximately 150 saplings were examined along a tributary of Abbot Creek where soil moisture conditions were suitable for germination and rapid seedling growth. With almost full sunlight, the young trees had grown to heights varying from 5 to 15 feet.

Of the 150 saplings, 54 had been damaged by small rodents. Of these, 27 had been completely girdled and were dead, and the remaining 17 were partially chewed and displayed varying degrees of browning foliage. There was no apparent selectivity for trees of any size class or crown condition.

Judging from the tooth marks on the xylem, the rodents were small, probably meadow mice, *Microtus* sp, or possibly gophers, *Thomomys* sp. Bark from two of the trees was removed to a height of about 1½ feet above the ground, indicating that the feeding may have occurred during the winter on the surface of the snow. Similar microtine damage has been observed by the authors on *Abies concolor* nearby in Kings Canyon National Park,, but it has not been previously recorded for the giant sequoia.

Nearly all of the dead saplings were being attacked by a fungus whose bright yellow fruiting bodies clustered densely at the base of each tree (fig. 1). Robert Bega of the Pacific Southwest Forest and Range Experiment Station, and Lee Bonar of the University of California identified the fungus as *Hyphloma*, possibly *H. fasciculare*, a known saprophyte. This genus is previously unrecorded in association with sequoia. It seems noteworthy that a species of tree whose remnants have lain undecayed for as long as 2,000 years is here found in a state of decay within two or three years after death. The wood of these stems was, however, largely sapwood which lacked heavy deposition of tannin characteristic of old heartwood.

Several of the dead trunks which were examined for insect activity showed considerable working of Cerambycid beetles, *Semanotus ligneus amplus*, to a depth of 3 or 4 inches in the xylem tissue. These activities occurred after the death of the trees as far as could be ascertained.

These unique interrelationships are probably due in part to the usually wet soil habitat and lack of over story vegetation in which these trees are now growing. Such conditions are conducive both to microtine populations and to the growth of the fungus. Within the range of the giant sequoias, these conditions are uncommon at this early stage of plant succession. It is felt that an unusually high population density of rodents developed and, under winter conditions, they resorted to the sequoia saplings which provided the most abundant source of food. The damage inflicted by the rodents was followed by fungus and beetle attacks upon the weakened or killed trees.